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Diagnostic and Prescriptive Benefits of Consumer Participation in Virtual Communities of Personal Challenge

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Diagnostic and Prescriptive Benefits of Consumer Participation in Virtual Communities of Personal Challenge

Abstract

Purpose – The purpose of this article is to show how active participants within *personal challenge* virtual communities (e.g., virtual health communities, online legal forums etc.) derive learning benefits from their involvement within the community. In doing so the research conceptualises and tests a model of engagement within such virtual communities.

Design/methodology/approach – This research was conducted through the design of a survey administered to an online panel of active participants from several virtual health communities. Structural equation modelling was used to test the conceptual model.

Findings – Along with well researched concepts such as social identification, this research identifies diagnostic and prescriptive benefits as key learning benefits associated with active participation within personal challenge communities. These benefits drive social support which individuals attain from these virtual communities, which in turn drives engagement within the community. It is also found that anticipated negative emotions from leaving the community mediate social support and engagement.

Originality/value – This is one of the first studies to develop a model of consumer engagement with *personal challenge* virtual communities. The findings make a contribution to the field of online communities by showing how learning benefits (diagnostic and prescriptive) transpire within these communities and by showing how these benefits lead to greater community engagement.

Keywords: active participation, virtual community, diagnostic and prescriptive benefits

Diagnostic and Prescriptive Benefits of Consumer Participation in Virtual Communities of Personal Challenge

Peer-to-peer virtual communities (VCs) continue to be among the most visited destinations online, and are an important influence upon consumer decision making. With ownership of mobile devices at an all-time high and continuing to rise, individuals are increasingly visiting such social networking sites to interact with others and solve problems that they face. Recent statistics show that one-third of US adults use such sites to find out more about a medical condition, among other things (Anderson, 2015). Virtual health communities like WebMD average nearly 12 million unique visitors per month, competing with mainstream news websites. In these VCs individuals search for information to diagnose a health condition and actively participate by posting questions and responses to other community members.

Research on VCs has roots in consumption communities and has focused on understanding brand enthusiasm (Muniz and O'Guinn, 2001), hobbyists and social chatter (Algesheimer, Dholakia, Herrmann, 2005; Bagozzi, Dholakia and Mookerjee, 2006) and professional activity such as work related helping behaviours (Andersen, 2005). One emerging theme within the VC literature has been concerned with peer-to-peer problem solving, drawing on the collective wisdom of a global resource base of users (Mathwick, Wiertz and de Ruyter, 2008). The present study extends research on VCs by shedding light on a specific sub-category of peer-to-peer VCs which have been termed virtual communities of personal challenge (Johnson and Lowe, 2015). These personal challenge VCs are communities where participants engage in self-help to cope with a range of personal challenges related to health, financial or legal issues which may undermine their current quality of life. At personal challenge VCs such as Mentalhealth.com participants exchange coping strategies in a mental health support community on topics such as bipolar disorder, depression, schizophrenia and addiction. Other personal challenge VCs such as

dailyStrength.org, a family issues support forum, allows participants to discuss family relationships and parenting, and ILW.com, allows participants to discuss immigration and visa related issues.

Such communities cover a number of personal challenges and allow individuals to interact with each other, and professionals, to overcome their personal challenges. Individuals engage in these communities out of necessity and participation often provides valuable motivation and mental toughness to cope with or overcome their personal challenge. Although the potential of VCs to influence consumer purchase decisions has been long recognised (Hagel, 1999), research on VCs that coalesce around a personal challenge is more sparse within the literature. Despite shedding light on some of the unique consequences surrounding participation in such communities, research is less clear on the benefits that consumers gain from interacting within these personal challenge virtual communities.

Research on VC participation has identified consumer benefits that can be broadly categorized as identity defining, socially supportive and learning related (e.g., Dholakia et al., 2009; Nambisan and Baron, 2009). While researchers have argued and demonstrated that learning or knowledge sharing is a critical motivator of community participation (Koh and Kim, 2004), very little is understood about the different types of knowledge consumers gain from active participation within personal challenge VCs. We address this gap in the literature by proposing *diagnostic advice* and *prescriptive advice* as benefits consumers experience from actively participating in communities of personal challenge. We study these as outcomes of active participation, rather than more passive participation within such communities, where these benefits are less likely to be realised.

The present study also investigates *how* these benefits translate into increased engagement with the personal challenge VC, recognising the more motivational outcomes of active participation within the VC. Social support within communities of challenge is likely

to be intense in light of the severity of challenges faced by participants. Participants face challenges such as drug addiction, illness, criminal conviction, deportation, gambling addiction, and bankruptcy that make intense social support and group social identification likely. The present study evaluates the potential of personal challenge VCs to generate social support and shows that this social support impacts upon individual anticipated negative emotions and ultimately VC engagement. This extends work in the area of brand communities (Algesheimer et al., 2005) to better understand the mechanism through which learning benefits such as community identity drive engagement within the personal challenge VC. Consequently this study also contributes to the literature on engagement within VCs (van Doorn et al., 2010) by showing how such personal challenge VCs can stimulate engagement within the community, in light of their unique characteristics.

Personal Challenge Virtual Communities

Within peer-to-peer VCs individuals with common interests share their experiences and interact with others in the community, often to find solutions to problems and challenges they may face, but often to assist others in solving *their* problems. These communities are characterised by participation through volitional choice (Bagozzi and Dholakia, 2002; Nambisan and Baron, 2009), where participation typically occurs when individuals are motivated to seek information to solve a problem that exists. Such communities also exhibit a sense of moral responsibility or felt sense of obligation (Muniz and O'Guinn, 2001) where knowledge and experiences are shared to improve the well-being of others. This participation and sense of moral obligation stems from a consciousness of kind exhibited within the community (Gusfield, 1978; Muniz and O'Guinn, 2001), whereby opinions and beliefs are reinforced through members' exchanges. These benefits have been characterised as comprising functional and social components within product related VCs (Dholakia et al.,

2009). Functional benefits are typically learning related and are about helping customers to more effectively use a product or service. These benefits are seen as a mechanism for generating consciousness of kind (Muniz and O'Guinn, 2001). The literature suggests in-depth discussion within the community allows participants to demonstrate expertise and build a credible reputation and this enhances member learning and a range of other hedonic benefits realised by members. (Nambisan and Baron, 2009).

VCs are especially effective as learning organizations because they are horizontally structured with networked-based expertise (rather than hierarchical-based) that can be rapidly mustered to provide quicker prescriptive advice than their offline counterparts (Finholt and Sproull, 1990; Koh and Kim, 2004). We draw on the functional learning benefit perspective to frame the benefits that individuals receive with personal challenge VCs as having diagnostic and prescriptive dimensions.

Research Hypotheses

Learning Benefits of Active Participation

Participation occurs within personal challenge VCs once an individual recognises they have a problem that may benefit from peer-to-peer contact, and once they identify with a VC.

Rodgers and Chen (2005) in a study of the psychological benefits of breast cancer patients participating in internet communities cite information exchange as being among the most frequently cited reason, second only to giving social support. Therefore, consumers are motivated to interact with such VCs to help deal with an existing personal challenge, and to reciprocate by helping others to deal with their challenges. Research in personal challenge VCs thus distinguishes passive participation from active participation (Shang, Chen and Liao, 2006). Active participation relates to the frequency with which consumers read others' comments, post comments and respond to others within the VC. Active participation is a behavioural construct that reflects how often an individual interacts within a community.

Active participation delivers diagnostic and prescriptive advice to community members.

Diagnostic advice is information concerning the nature of a problem and its possible causes that help consumers to better understand the choices available to them. The following discussion thread excerpt from DiabetesFORUM.com by “kibescorp” illustrates how diagnostic advice often unfolds within peer-to-peer VCs.

“Hello. For a while now I've had odd symptoms. My vision sometimes becomes SLIGHTLY blurred in ONE eye at a time (it's never both, and that's how I can tell there's a blur, by comparison of the two). The blurriness is mild and usually only lasts for MINUTES at a time. The eye that is affected alternates.....I know this could be indicative of a ton of different things (including lyme disease), but I'm concerned right now about whether it could be related to blood sugar?”

“Optimist”, in response reads:

“I would recommend you to get your BG tested, and then you will know if it is diabetes. It is impossible to know anything if you don't check it. When I got my diabetes last year I was always thirsty even if I drunk 5-6 liter water each day. I lost 8 kilo in a really short time (a couple of months), I urinated a lot and my eyes were blurry all the times.”

Participants also gain prescriptive advice from visiting personal challenge VCs.

Prescriptive advice refers to information exchanged that provides insight on product, service or actions to be taken that leads to some measure of alleviation of the situation. An excerpt of a post on WebMD by “sadblossom” illustrates prescriptive advice among participants in personal challenge communities:

“...I. sense I finished radiation 2 yrs ago I take colds/viruses/sore throats/coughs very easy and very often, as I did not before.....and.....I have also had an itchy scalp sense radiation treatments too. Is either of these comman? And if they are what can be done... By the way.....it's was 2 yrs in Aug. sense surgeries and my arm is still numb, still does not have normal strength or virsitivity and both arms have become very large but are not swollen. I have had a weight gain and do not know why. Doctors do not commit on that. I am still on Arimidex, 2 years in March. Still fatigued and ribs and spine still hurt.”

“GGrandmaJan”, in response writes:

“Have you checked with your primary Dr on all your questions? I found the Onc Dr's usually only handle the cancer stuff. Perhaps you need an appt with your Radiation Dr and see if he/she could answer your questions. I do not feel these could be related to Rads--but I am no Dr. I didn't have any of these things happen after I did rads. Perhaps

something else is going on with you. As for the wt gain---when I was on Tamoxifen I found the wt creeping up no matter what I did. It could be from the Arimidex.”

A fundamental benefit to the participant is the opportunity to compare her experience with others who are further along in understanding their circumstance. Seekers of diagnostic and prescriptive advice are trying to gain an initial understanding of their situation and to identify the likely scenarios they can expect and this objective should be aided by active involvement within the VC. Participation is an ‘economy vehicle’ allowing them to better understand their circumstance and the options available without depleting their resources. Even in the presence of adequate resources, Conservation of Resources Theory (COR) suggests that people may seek to conserve their resources by seeking freely available benefits (Hobfoll, 1988; Hobfoll, 1989). According to COR research even when people are not confronted by stressors they will strive to accumulate resources to offset future environmentally determined resource demands. As might be expected, active participation is strongly associated with the perceived informational value of interacting with community members (Wiertz and de Ruyter, 2007).

The word-of-mouth literature also speaks to the inclination of consumers to seek and provide advice to each other. Hennig-Thurau et al. (2004) argue that online word-of-mouth is often motivated by a need to help other consumers with their buying decisions and save them from negative experiences. This observation relates directly to VCs that are not sponsored by specific brands. Personal challenge VCs that are not tethered to a specific product or service brand are likely to demonstrate independent thinking. Altruistic or pro-social beliefs may assume greater influence within such VCs than may be the case for firm-sponsored brand communities. Price, Feick and Guskey (1995) refer to consumers that are attentive to helping others as ‘market helpers’ and suggest that beyond general information sharing, market helpers provide more sophisticated forms of assistance to fellow consumers. These helping

behaviours toward fellow consumers include structuring their decision problems, validating their decision, evaluating product alternatives and making their final decisions.

The inherent features of VCs also make them well suited for conveying prescriptive advice. The crowd sourcing nature of VC communities means that they have the ability to quickly amass the collective knowledge and experience of community members to deliver value and thereby strengthen the community at minimal to no cost to the beneficiary (Wireman, 1984). Additionally the global nature of the internet enhances their ability to connect individuals with a similar interest. Consequently, it is anticipated that these learning benefits accrue based on active, rather than passive, participation within the VC.

Learning Benefits and Social Support in Personal Challenge VCs

Psychologists conceptualise social support as “the perception or experience that one is loved and cared for, esteemed and valued, and part of a social network of mutual assistance and obligations” (Taylor et al., 2004, pp. 354-55; cf. Rosenbaum and Massiah, 2007). Health education researchers have suggested that health related VCs hold certain advantages over face-to-face groups in providing social support. Virtual communities are always available, with no geographic barriers. Sociodemographic factors such as age, gender, social status and ethnicity are unobservable (Finn, 1999; Madara, 1997). But limitations of virtual social support have also been noted. The inability to observe facial expression and body language within the medium limits consumers’ ability to convey and detect visual and aural cues, which increases the likelihood that written statements may be misinterpreted (Galinsky et al., 1997; White and Dorman, 2001). Despite its limitations, social support within personal challenge VCs comes at no monetary cost to the consumer, which makes the value proposition very compelling.

“Emotional support refers to having people available to listen, to care, to sympathize, to provide reassurance, and to make one feel valued, loved and cared for” (c.f. Helgeson, 2002). Within the services marketing context, socially supportive behaviours among consumers have been demonstrated to significantly increase customer citizenship behaviours and loyalty (Adelman and Ahuvia, 1995; Rosenbaum and Massiah, 2007). We are not arguing that emotionally supportive comments made among anonymous participants in a virtual community approach the sophistication or effectiveness of emotional support from family, friends or clinicians. However, consumers do have emotionally supportive exchanges within virtual communities that have the potential to influence behaviour. Experiences of emotional support directly through elicited requests or indirectly via observing relevant responses to the requests of other community members are likely to motivate consumers to reciprocate with supportive and informative actions toward the community.

It is anticipated that experiencing prescriptive advice and diagnostic advice will have a positive facilitating effect on perceptions of social support received within the community. Consumers pursuing prescriptive and more so diagnostic questions, by definition have limited knowledge of their disposition. Consequently, they may be limited initially to asking questions rather than providing advice. However, as participants start acting on the advice they encounter, by perhaps treating them as testable hypotheses as they seek professional expert opinion, they become better qualified and may have a greater sense of comradeship, and be supportive of the community. This is illustrated more generally by Dholakia et al. (2004) who find that participation and engagement within the community increases once an individual’s functional goals have been attained. Following from this discussion, the following hypotheses are proposed.

H₁: The higher the level of diagnostic advice experienced by consumers in a VC, the higher the level of social support experienced in the VC.

H₂: The higher the level of prescriptive advice experienced by consumers in a VC, the higher the level of social support experienced in the VC.

Identification and Social Support

Social identity theory posits that individuals enhance their self-esteem by associating with other individuals, groups and organizations that reflect their desired identity (Tajfel and Turner, 1979). An essential principle of social identity theory is that when individuals realise that they share a common disposition with others, it becomes a potent basis for working together to overcome common challenges. This principle has been illustrated by research showing that low-status groups find relief from discrimination and injustice by recognizing their common identity with individuals of similar status and consequently using this as a basis for initiating restitution (e.g. Branscombe et al., 1999; Postmes and Branscombe, 2002).

Because of this it has been shown in the brand community literature that individuals with a stronger group identity are likely to also be more highly engaged with the community (e.g., Algesheimer et al., 2005). While we agree that engagement remains the fundamental goal of many communities and is likely to be influenced by participants' sense of community identification, it is less clear within the brand community literature how this link transpires theoretically.

Consumers pursue their identities by associating with communities to create overlaps between their public image and those of the desired community or brand (Bhattacharya et al., 1995; Bhattacharya and Sen, 2003). Consumer participation in health-related communities is goal directed behaviour. Brand community researchers observe that consumers pursue their identities by adopting the values and norms of the community and by devoting their efforts to strengthening these communities (McAlexander et al., 2002; Algesheimer et al., 2005).

Recent research in the area of mobile health has shown that social influence is an important antecedent to usage of mobile health technologies (Dwivedi et al., 2016). Extending this logic to personal challenge VCs where individuals are likely to share a common disposition with

others in the VC, we argue that an important consequence of active participation within such VCs is the enhanced social identity individuals gain from actively participating within the community, and this greater degree of social identity will lead to higher levels of social support.

H₃: The higher consumers' perceived identification with the virtual community, the higher the level of emotional support they experience.

Anticipated Negative Emotions

Anticipated emotions are a form of prefactual appraisal (Gleicher et al., 1995) that anticipates the implications of the occurrence or non-occurrence of events for the future. We examine consumers' negative anticipated emotions contemplated from leaving or being denied access to the VC as these have been identified in other research into communities where strong social bonds exist (e.g., Bagozzi et al., 2007; Bagozzi and Dholakia, 2006; Bagozzi and Dholakia, 2002). As stated by Bagozzi et al. (2007, p. 85) "The role of anticipated emotions occurs as people, when deciding whether to act in goal-directed situations, such as participating in online social interaction, take into account the emotional consequences of both enacting and not enacting that behavior." (c.f. Bagozzi et al., 2007 p. 85).

Bagozzi and colleagues frame negative anticipated emotions as having a direct effect upon desire and social intentions in such goal directed situations. As with the brand community literature we anticipate these appraisals would be an important influence upon participants' future involvement in the community given the strong social bonds developed as a consequence of participating actively and assisting others with their challenges. Emotional support is a source of self-esteem improvement and a fundamental benefit that VCs provide to consumers. Therefore the more consumers experience social support within the VC, the more essential the community becomes to their wellbeing and motivation to cope with their challenge. Consequently, consumers should experience negative emotions (e.g., anger,

frustration, disappointment, anxiety etc.) when they contemplate an inability to visit the VC. The more consumers experience a pleasant and supportive environment, the more negative their forward looking emotions about not being able to visit the community are likely to be (Bagozzi et al., 2007). Consequently we anticipate that social support within personal challenge VCs will increase consumer loyalty to the community. Following from this logic, we examine the following hypothesis.

H4: The higher the level of social support experienced by consumers, the higher their level of anticipated negative emotions from discontinuing participating in the VC.

Engagement with the VC

Customer engagement is defined as “the customers’ behavioral manifestation toward a brand or firm, beyond purchase, resulting from motivational drivers.” (van Doorn et al., 2010, p. 253). Engagement has been a fundamental outcome within the study of brand communities, presumably because of its association with other key marketing outcomes such as word-of-mouth, loyalty, satisfaction, empowerment, connection, emotional bonding, helping behaviours, trust and commitment (Brodie et al., 2013; van Doorn et al., 2010). Typical antecedents to engagement include identity, satisfaction and trust. However, in the context of virtual communities these associations require further exploration. For example, Algesheimer et al. (2005) show how identity leads to engagement but do not elaborate further on the causal path and other potential mediating relationships. Understanding how identity and other learning benefits within VCs lead to engagement is an open question.

VC participants who have been involved in socially supportive exchanges are more likely to exhibit higher levels of engagement with the VC. As consumers become active participants the VC becomes an important source of advice and social support, and a mechanism that can serve a purpose beyond more traditional forms of medical advice. As participants gain from this support, they become more inclined to reciprocate by providing

social support to others experiencing a similar challenge. Analogous to the branding literature where repeat purchase is a necessary but not sufficient building block to achieving brand loyalty (Jacoby and Kyner, 1973), active participation leads to enhanced exchanges between community members and further attitudinal attachment to the community and its participants (Algesheimer et al., 2005). Consequently, it is anticipated that consumers who actively participate in the community are more likely to experience socially supportive exchanges, leading to more positive attitudinal consequences, value generation and higher levels of engagement.

H₅: The higher the level of social support experienced by consumers, the higher their level of engagement within the VC.

However, though it is anticipated that social support has a direct association with engagement, it is also proposed that anticipated negative emotions are an important mediator between social support and engagement. That is, engagement is driven by social support, but also by an individual's anticipated negative emotions. Those VC participants who have experienced social support and have been satisfied with their exchanges within the VC are also more likely to exhibit anticipated negative emotions when they contemplate not being able to visit the VC (see H₄). These anticipated negative emotions are a reflection of an individual's attachment to the community and the social support it provides to them (and the support they provide within the VC). As a result individuals who exhibit more negative emotions from imagining not being involved with the community are likely to be those individuals who will be more engaged with it, leading to H₆. Based on the hypotheses the conceptual model guiding this study is presented in Figure 1.

H₆: The higher the level of anticipated negative emotions, the higher their level of engagement with the VC.

Place Figure 1 about here

Method

Procedure and Data Collection

To test the model developed, respondents were surveyed in relation to the constructs in Figure 1. Respondents were recruited through an online panel provided by a professional market research company and were frequent internet users. In total 4,849 panel members were invited to participate in the study. Initially respondents were screened based on whether they had an existing health condition or whether they were carers for someone coping with a health condition, consistent with other VC research (e.g., Nambisan and Baron, 2007). Healthcare professionals were excluded. They were then screened about their activity on the VC, including the forums used and frequency of access. Based on the screening questions 404 respondents completed the questionnaire for an incidence rate of 8.3%. A further 74 respondents were excluded from the study based on incomplete responses leaving 330 respondents. These respondents were then screened further to ensure they were sufficiently familiar with the personal challenge VCs that they indicated visiting. Respondents who had visited the VC less than four times in the less three months were excluded from further analysis, leaving 270 active VC participants.

Respondents reported that the majority of the VCs were moderated (80%), and that the forums were either corporate owned (32%), university owned (19%), owned by a professional association (33%), or run by an individual (16%). The median age of respondents was 44, and a wide range of medical conditions were represented in the sample including diabetes (8.4%), depression (8.1%), obesity (7.5%), multiple sclerosis (5.7%), cancer (4.8%), arthritis (3.6%), fibromyalgia (3.0%), high blood pressure (2.7%), chronic pain (2.4%), and anxiety (1.5%). Standard tests for non-response bias did not indicate any concerns.

Measurement

New measurement scales were developed for active participation, diagnostic advice and prescriptive advice. First, the literature was reviewed for construct definitions and to clarify the domain of each construct. Next, discussion threads across several VCs were reviewed to further clarify the domain of each construct and to generate sample items (Churchill, 1979). Although research in marketing has traditionally used conventional qualitative approaches to generate measurement items (e.g., in-depth interviews, focus groups), online community researchers (e.g., de Valck, van Bruggen and Wierenga, 2009; Loane, Webster and D'Alessandro, 2014; Mathwick, Wiertz and de Ruyter, 2008; Yao, Zheng and Fang, 2015) are increasingly studying discourse between online community participants utilising netnographic approaches to data collection (Kozinets, 2002). By observing community member interactions in a natural setting researcher bias is minimised. Exploratory factor analysis was conducted to determine the need for purification of the *new* measures (Confirmatory Factor Analysis – CFA – was run later later on to assess the measurement properties of the all measures). All items loaded cleanly on the intended constructs and the new scales demonstrate robust Cronbach's Alphas ($\alpha_{\text{active participation}}=.73$; $\alpha_{\text{diagnostic advice}}=.92$; $\alpha_{\text{prescriptive advice}}=.88$). Following Shang, Chen and Liao (2006) the four-item scale for active participation evaluates the frequency with which consumers engage in different types of interaction with the VC, namely, posting questions, posting articles and links and responding to questions and comments. Note that these elements involve making a contribution and not simply observing or "lurking". The diagnostic advice scale is influenced by Calder, Malthouse and Schaedel's (2009) utilitarian experiences scale that evaluates consumer beliefs that a web site provides information that helps them to make decisions in their lives. The focus is narrowed to how the VC helps the consumer to better understand what is happening to them. The three-item scale taps the notion of community participants helping one another

to better understand their experience, their situation and relevance to their concerns. Prescriptive advice is measured using a new four-item scale. The scale is influenced by the work of Nambisan and Baron (2009) and Constant, Sproull and Kiesler (1996) concerning normative expectations of helping behaviours among community members. The prescriptive advice scale taps recommended product and service prescriptives, how prescriptives can be more effectively applied and prescriptives that should be avoided. Identification with the VC was measured using a three-item social identity scale adapted from Algesheimer et al. (2005).

Social support was measured using a five-item scale from Rosenbaum and Massiah (2007), anchored by 1 (strongly disagree) to 7 (strongly agree). We measured negative anticipated emotions using an 11-item scale employed by Bagozzi and Dholakia (2006). Because of the number of items involved we combined the eleven anticipated negative emotions items into two “item parcels” using the partial disaggregation model, following Bagozzi and Dholakia (2006) and consistent with Bagozzi and Heatherton (1994). The eleven items were subjected to a factor analysis which identified two factors within the items (negative emotions 1 and negative emotions 2). The items for each parcel were then averaged to create the two indicators for anticipated negative emotions. Engagement was measured with a four-item scale adapted from the “community engagement” measure of Algesheimer, Dholakia and Hermann (2005), and was anchored by 1 (strongly disagree) to 7 (strongly agree). Scales demonstrated high Cronbach’s Alpha ranging from .73 to .97, with most over .85. The full list of measurement scales and diagnostics employed in this study are presented in Table I.

Place Table I about here

Common Method Variance

We attempted to minimize the impact of Common Method Variance (CMV) on the study's findings by following some of the procedural controls suggested by Podsakoff et al. (2003). We also assessed the impact of CMV following the marker variable method, as recommended by Lindell and Whitney (2001). The marker variable, a variable theoretically unrelated to our focal variables, helps to highlight correlations between constructs that *should not* be correlated. If a correlation exists between the marker variable and one of the focal variables this may provide evidence of some other common source of variance and assists in adjusting the other coefficients within the correlation matrix. The marker variable in this study was respondents' overall attitudes to the Ford motor company brand. The lowest positive correlation between the marker variable and a focal variable was the correlation between the marker variable and anticipated negative emotions ($r=.08$), and this was used to adjust the remaining correlations. The normal correlations are shown below the diagonal and the adjusted correlations are shown above the diagonal in Table II. We also determined the statistical significance of the adjusted correlations (Lindell and Whitney 2001). None of the correlations which were significant before the adjustment lost significance after the adjustment, indicating that the hypothesized relationships were not impacted by CMV.

Results

Measurement Model

Data analysis was conducted using AMOS 22. CFA was run using the constructs in Figure 1 to assess internal consistency and discriminant validity of the measures. Typical diagnostics indicated that the measurement model fitted the data relatively well ($\chi^2 = 372$, $df = 174$; CFI = .958; TLI = .949; PNFI = .766; RMSEA = .065). Cronbach's alpha and AVE assessed internal consistency. As Table I shows, all alphas were above the recommended minimum of .70. The AVEs ranged from .669 to .873, and were well above the recommended minimum of

.50 (Bagozzi and Yi, 1988). Taken together, these findings provide strong support for the internal consistency of the measures. Table I shows the standardized item loadings for each construct, and Table II shows the interconstruct correlations. All of the factor loadings met or exceeded .70. Comparison of the AVEs from Table II with their respective squared interconstruct correlations revealed that all were higher, showing evidence of discriminant validity.

Place Table II about here

Structural Model

Given the convincing discriminant and convergent psychometric properties exhibited by the measurement model, next the structural relationships were estimated. These results are presented in Table III. The structural model fits the data reasonably well with a χ^2 [180] of 474.8, $p < .001$; CFI of .938, a TLI of .927, a PNFI of .775 and an RMSEA of .069. Although the Chi-square value is significant, the other model diagnostics indicate an acceptable level of fit for the proposed model to the data.

The estimates for the structural relationships indicate that all the hypotheses are supported. Diagnostic advice, prescriptive advice and social identity all increase social support, as predicted (H_1 , $\beta = .274$; $p < .001$; H_2 , $\beta = .233$; $p < .001$; H_3 , $\beta = .439$; $p < .001$). Social support positively influences anticipated negative emotions (H_4 , $\beta = .334$; $p < .001$) and engagement (H_5 , $\beta = .604$; $p < .001$), and anticipated negative emotions influences engagement (H_6 , $\beta = .109$; $p < .05$).

To further clarify the nature of the mediating role of negative anticipated emotions between social support and engagement the Preacher-Hayes procedure was used. When social support leads to engagement through negative anticipated emotions, the direct effect of social support on engagement was significant ($t = 10.83$, $p < .001$), and the mediated path (social

support → negative anticipated emotions → engagement) was significant and positive (95% confidence interval: .0153, .1091). These results indicate complementary mediation (Zhao, Lynch and Chen, 2010). Therefore, it appears, consistent with the structural model proposed, that social support has a direct effect upon engagement but also influences engagement through the mediating effect of anticipated negative emotions.

Place Table III about here

Discussion

This article proposes that active participants in VCs of personal challenge derive learning benefits from diagnostic advice and prescriptive advice that results from active participation in personal challenge VCs. These learning benefits translate into increased social support within the VC and greater levels of VC engagement. The findings of this study make four important contributions to the burgeoning literature on VCs, which is predominantly focused on brand communities and other P3 VCs, rather than personal challenge communities.

This article develops and tests a conceptual model of the antecedents to engagement within *personal challenge* VCs. Given the voluminous nature of VC literature it seems pertinent to explore the key drivers of engagement in contexts beyond the brand community and P3 VCs. Overall, the model provides us with an understanding of how consumers learn within such personal challenge VCs and the levers that managers can use to influence engagement within them.

In doing so, this article proposes a new conceptualisation of electronic channel learning benefits, showing that consumers distinguish between diagnostic advice and prescriptive advice as distinct benefits of participating in personal challenge VCs. Both diagnostic advice and prescriptive advice facilitate social support. This approach to conceptualising learning benefits is a potential refinement of earlier notions of consumer

functional learning benefits or knowledge sharing benefits applied to VCs and web sites (Koh and Kim, 2004; Nambisan and Baron, 2009), and may open the door to a deeper understanding of customer benefits for a broad range of electronic channels including micro-blogging social media such as Twitter and Facebook.

Diagnostic advice and prescriptive advice may also be applied in the context of two widely used frameworks. For example, the use and gratifications framework (U&G) makes a broad distinction between *media content* gratifications and *media process* gratifications as reasons for engaging media such as computers and television (Katz, 1959). To illustrate, individuals may be attracted to a web site or VC by the value of information content and by pleasurable experiences of using the VC (Stafford, Stafford and Schkade, 2004). Diagnostic advice and prescriptive advice potentially constitute a refinement of the media content aspect of the U&G framework, in that the media content may offer diagnostic gratification or prescriptive gratification. To illustrate, media or web site content may help people to better understand a context but may also provide ways of better navigating the context to achieve a desired outcome. Alternatively, diagnostic advice and prescriptive advice may also be applied to the Technology Acceptance Model (TAM). The TAM (Davis 1989) holds that consumer behavioural intentions toward technology mediated channels result from the degree of usefulness and ease of use of the technology. Researchers have suggested several antecedents of usefulness including learning (Venkatesh and Davis, 2000). Here it is suggested that diagnostic and prescriptive learning benefits are potential antecedents of usefulness and behavioural intentions toward technology-based channels like web sites and social media such as Twitter.

This research also contributes to the literature on communities by showing how social identity leads to increased engagement. Brand community researchers (e.g., Algesheimer et al., 2005) conceptualise and empirically demonstrate a direct link between social identity and

community engagement but the inner workings of this link are yet to be explored. The findings in our study show how social identification benefits lead to increased engagement in the context of a personal challenge VC. Social identity benefits are important in generating the much needed social support that participants search for in situations of personal challenge. Though we do not suggest that such communities provide the sophistication of other alternative support networks, participants do become involved for a variety of reasons including anonymity and ease of accessing a personally relevant community with no geographical constraints. This involvement stems from their identification with the group and its challenges and leads to important elements of social support to cope with the challenge. In turn this social support is a key driver of engagement within such communities.

Finally, this research makes a contribution by showing how anticipated negative emotions mediate the relationship between social support and engagement. Though social support is a strong direct driver of engagement, in such communities, engagement can also be enhanced through anticipated negative emotions which may be a proxy for community “stickiness”. Active participants harness a good deal of social support for themselves and provide it to other members through involvement within the community. Consequently this intense level of social support is reflected by individuals exhibiting negative emotions when they are faced with the prospect of not being able to participate in the community for a period of time. Because of this, such individuals are likely to exhibit higher levels of engagement within the community.

Managerial and Policy Implications

Personal challenge VCs are groups of consumers united by a common interest or challenge and as such represent a highly desirable target for solution providers. This makes our study findings especially insightful to operators of VCs that seek civic engagement. Our research

model suggests that managers need to provide adequate diagnostic and prescriptive information that leads to social support and ultimately stickiness and further engagement within the VC. Although our study did not examine the order in which these types of advice are sought by participants, we conjecture the sequence by which VC stickiness is achieved. We surmise that participants are motivated initially by a sense-making need for diagnostic information to understand and provide a context for their experiences. They then go through a consultation process with a professional, during which prescriptive advice becomes more important. Depending on the nature of the problem, social support may be sought. As participants become more experienced, they become inclined to reciprocate by providing social support to others experiencing a similar challenge. Holistically, this sequence may be considered as a methodology for communities of challenge to build community stickiness. Diagnostic advice may be used as a lead generation tool. Banner advertising and promotional emails can appeal to consumer needs to better understand a problem they are having. When triggered to visit the web site by this appeal, they become exposed to a variety of diagnostic types of information and at the appropriate point they are prompted to explore prescriptive solutions and socially supportive comments of peers. The idea is to increase community visits and conversion rates by providing diagnostic, prescriptive and supportive information in a manner that matches consumer information needs. This has the potential to increase stickiness as customer needs are met over the learning and decision making phases of the customer purchase cycle.

Consistent with prior studies of VCs, our study shows that consumer identification with the community is a significant determinant of social support. We argue that VCs will more effectively create VC stickiness by choreographing both expert and identity benefits to consumers. For example, a consumer who visits a VC in search of information on sickle cell anaemia should find perceptively credible information on the condition and while consuming

this information should be directed to a community that reflects a deep sense of commitment to treatment and causes connected with the disease. We recommend that managers of VCs consider a brand positioning and advertising strategy that embodies a dual positioning involving expertise content and strong identification with an issue of interest to consumers.

Customer journey mapping has become a dominant approach in industry for graphically representing the customer experience with a view to identifying deficiencies and generally leading the customer (rather than following) to a value laden relationship (Edelman and Singer 2015). The present study suggests that recognizing that customers have distinct diagnostic and prescriptive interest may be a critical insight for customer experience innovation, not only for VCs but across a range of digital services. For example, cues such as first time visit and search terms or stage in the journey may suggest a need for more diagnostic types of information from searchers rather than prescriptive types of information. For repeat visits a customer may be directed to more prescriptive information on a customized basis. Managing the flow of diagnostic and prescriptive information to match the learning requirements of a customer is a promising avenue of customer journey innovation.

One implication of the results here is that major healthcare providers should have significant involvement within these communities. If emotionally supportive communities flourish independently of the involvement of healthcare professionals, they risk becoming the source of misconceptions and doubt about the causes and treatment of many conditions, and this may lead to scepticism towards more traditional sources of advice (Johnson and Lowe, 2015). On the other hand, some may argue that the absence of significant influence by doctors and drug companies is a good thing. Such VCs could have strong consumer-to-consumer independence and harbour healthy scepticism for all putative treatments. Healthcare providers and drug companies must become actively engaged in healthcare VCs not only by presenting their products as solutions to consumer problems and but also by

positioning their brands as sources of information and expertise beyond what is currently embedded in their products and services. More than ever, brands associated with personal challenge communities must become learning sources to consumers.

The findings of this study should also be of interest to consumer advocates and public policy makers. The use of the internet to sell prescription drugs unlawfully to US consumers and as a source for medical misinformation has been documented (Forman and Block 2006). When a consumer receives social identity benefits from active participation in such communities, she may not be self-aware of her yearning for a more optimistic prognosis of the circumstance leaving her incapable of an objective evaluation, and receptive to incorrect advice. This study's finding that social identity leads to benefits in perceived social support social support should be a cause for concern to public policy makers and consumer advocates as this may result in increased scepticism for out groups which provide more conventional advice. The potential exists for purveyors to engage in VC discussions to unproven and even fraudulent solutions for profitable gain. For example, sufferers of optic nerve atrophy, which is damage to the optic nerve most commonly from reduced blood flow, are confronted by purveyors of so called optic nerve support packaged remedies and yoga that offer false hope. Consequently, we recommend that personal challenge VCs are monitored to ensure brand credibility and the possible negative effects of third party involvement and the dangers of taking inappropriate advice, even though that advice may seem supportive.

Professionals providing services to consumers in challenging situations should consider counselling consumers within VCs. Attorneys and physicians should engage customers within forums to reinforce professional advice and counter misinformation that could negatively influence post-purchase evaluation. Professionals should also consider pre-emptively advising their clients on inappropriate alternatives they are may encounter within VC discussion forums.

Study Limitations and Further Research Suggestions

Like most studies, this study has limitations that potentially constrain its findings. In developing the measurement scales for the new constructs in this study actual discussion threads from healthcare VCs were used as an indicator of the relevance of the constructs and to clarify their domain. Conventional approaches to item generation typically involve the use of qualitative techniques such as in-depth interviews or focus groups. Here we employed a content analysis of discussion threads because of the ability to observe community participants in a natural setting. To provide more conclusive evidence of face validity we could have employed a multi-method approach which utilised different forms of data. Furthermore this study is limited by the single source nature of the data collected here, though we utilized procedural techniques to control for CMV and statistical tests to ascertain its existence. However, for greater confidence in the findings here, further research could consider replicating and extending these findings using different data sources and different data collection methods.

A variety of chronic and non-chronic conditions were represented in this study. However, the sample appeared to be somewhat skewed towards more chronic conditions. It could be that the benefits which consumers attain from participation in the community differ depending on whether or not the condition is chronic or non-chronic, or accounting for other communities, how serious the challenge is. Given the variety of different forums available, future research can examine the nature of these benefits in more detail.

It was of theoretical interest to understand the mechanism through which social support leads to engagement in personal challenge VCs. However, the SEM results illustrate a statistically significant, but weak, coefficient between anticipated negative emotions and engagement with the VC ($\beta = .109$; $p < .05$). This is consistent with the mediation test which

revealed complementary mediation. In light of this further research should aim to assess i) the generalisability of this result and its robustness across different circumstances, and ii) the existence of other mediators to more comprehensively understand how social support leads to engagement and the things marketers can do to influence this.

Conclusion

This article examines the relatively unexplored context of people trying to overcome personally challenging situations through engagement in peer-to-peer VCs. We demonstrate that diagnostic and prescriptive benefits are potentially fruitful dimensions of learning benefits consumers gain from using internet-based resources to tackle personal challenges. Given these VCs are among some of the most widely consulted sources online and exhibit different characteristics to more frequently researched brand communities, findings about how to increase engagement in such settings has important implications for marketing managers and researchers.

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